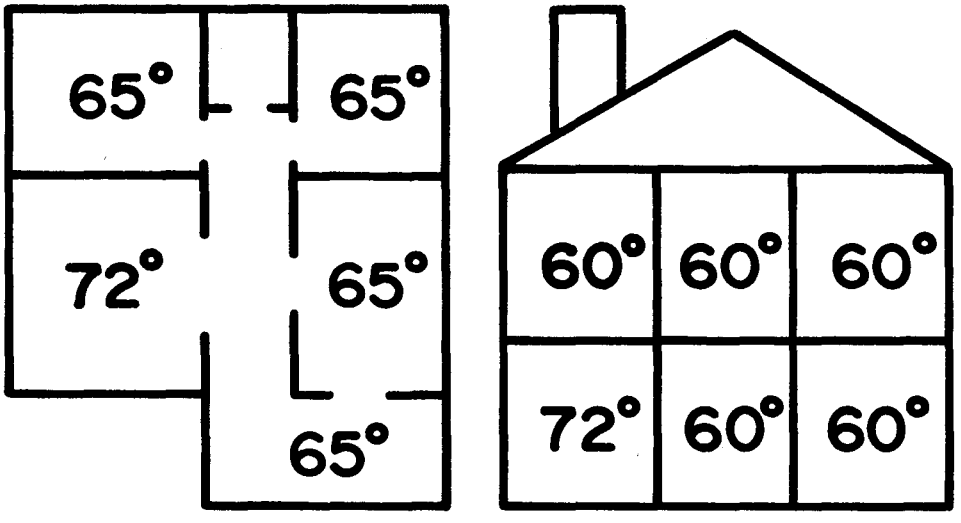
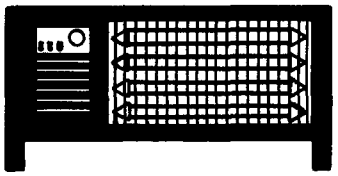
Agricultural Extension Service
University of Minnesota

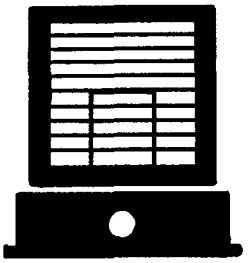
AG-FO-2234
1984

REDUCE HEATING COSTS BY INDIVIDUAL ROOM HEATING

Harold A. Cloud, extension agricultural engineer







Heating individual rooms of homes or other buildings has shown a marked gain in popularity over the past few years. Consumers are finding they can save heating dollars and still be comfortable by supplying heat only where and when it is needed.

This is possible through adjustments to the main heating system or by adding supplemental heat. For example, extra heat can be supplied to a family or TV room when it is being used. When the room is not in use, a lower energy-conserving temperature can be maintained.

Three methods of individual room heating are:

- Radiator or warm air register adjustments
- Zone or room control with individual thermostats
- Use of portable heaters

The advantage of individual room heating is that infrequently used rooms do not have to be heated at all times. When temperatures can be "dialed down" in any part of the house, a savings will result. If a specific room uses a different type of fuel than the main heating system, savings will depend on the price and heating value comparison of the room heater fuel vs. the main heating fuel (see section on economics).

Radiator or Warm Air Register Adjustment

For houses with central hot water or steam heat, individual radiators can be shut off in areas where full heating is unnecessary. For forced-air heat, unneeded air registers can be closed or a piece of cardboard taped over the register. In both cases, heat will continue to be sent to the rooms where it is desired. If the thermostat is in a room that will not be heated, you may need to relocate the thermostat, or add a thermostat in a heated room.

Normally an unheated room will stay above freezing, by indirect movement of heat within the house, unless the house is poorly insulated. If cool rooms begin to show signs of dampness or excessive condensation frost on windows, you will need to restrict the movement of water vapor to these rooms (by weatherstripping the door to the room, taping plastic, etc.). If dampness still occurs, you may need to restore heat to the room.

Zone or Room Control with Individual Thermostats

"Zone control" means that individual rooms are supplied with heat according to their need. Baseboard electric units with a thermostat in each room, for example, can keep each room at a selected temperature. Other forms of permanently located electric heaters with thermostats can be used as well.

Permanently installed and properly vented gas, propane, or kerosene space heaters can be used for zone heating, if the size of area to be heated justifies the cost of installation. An alternative is to install zone dampers in air ducts, or zone valves in hot water lines, with automatic thermostat control.

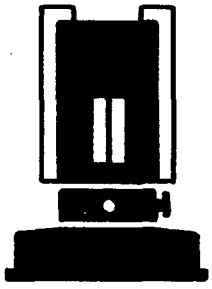
Savings with zone control are made by "dialing down" in as many rooms as possible. Each degree of thermostat set back below 70F will save about 3 percent of the heat used for that room. If *half* the rooms in the house are set at 50F, for example, the total heating bill would be reduced by about 30 percent.

Portable Heaters

There are two types of portable heaters: combustion or electric. Both types are available in two designs: convection and radiant. With convection heating, air is warmed and circulated, thereby heating the entire space. Radiant heaters spot heat objects or people.

Different kinds of portable heaters are for either short-term or long-term use. Short-term applications are where someone is present to monitor the use of the heater. Examples of short-term usage are the breakfast area, garage, TV room, workshop or bathroom. For bathroom use, refer to the section on safety.

Long-term applications are where the heater is expected to maintain a set temperature much the same as would be expected from a controlled heating system. These would usually be for long periods of time, possibly the entire heating season. Examples of long-term usage are added or finished areas with inadequate central heat or rooms where warmer temperatures are desired, such as a nursery or guest room.



	Advantages	Disadvantages
Short-Term	1. Low initial cost 2. Wide selection available 3. Portable 4. Gives quick response	1. May not be thermostatically controlled 2. Requires attendance
Long-Term:	1. Thermostatically controlled 2. Attendance not required	1. Initial cost of heater 2. Economics depends on local energy costs

Economics

The net savings resulting from individual room heating will vary with: (1) the area to be heated; (2) location of the area within the house; (3) type of heater and energy source; (4) price of energy for portable heating compared to that for central heating; and (5) operating time.

Depending on the area and location within the house, some or all of the heat added through a portable heater may replace central heating. If the area to be heated must have additional ventilation for combustion heaters, the extra air must be heated and will reduce the savings. (Refer to safety section for ventilation requirements.) Since added ventilation air is not required in rooms heated with electric heaters, caulking, weatherstripping, and window coverings will reduce energy needs and save money.

To compare electric and kerosene portable heaters, one gallon of kerosene is equivalent to 28 kilowatt hours (KWH). To compare electric and propane heaters, one gallon of propane is equivalent to 19 KWH. To compare kerosene and propane, one gallon of kerosene equals 1.5 gallons of propane

For example, kerosene costing $1.40 per gallon and electricity costing 5¢ per KWH will have equal energy costs for portable heating. These comparisons assume that ventilation air is required for combustion heaters, such that the net efficiency of portable combustion heaters is 70 percent.

The following table gives equivalent energy costs for portable heaters based on the assumption of 70 percent efficiency for kerosene and propane.

Electricity per KWH	Kerosene per gallon	Propane per gallon
4¢	$1.12	$ .76
5¢	1.40	.95
6¢	1.68	1.14
7¢	1.96	1.33
8¢	2.24	1.52
9¢	2.52	1.71
10¢	2.80	1.90

If extra ventilation is not required for safe operation of a combustion-type portable heater, for example, in a garage or farm building, the comparative costs for kerosene and propane can be adjusted upward approximately 30 percent.

To compare any type of portable heater to your central heating system operating cost, ask for a copy of Minnesota Agricultural Extension Service publication HE-FO-1860, *Fuel Prices and Heating Cost in Minnesota,* from your county agricultural extension office, in Chapter 5 of the *Energy Handbook.*

Another factor in the economics of portable heating is the cost of the equipment. These costs will vary depending on quality, safety features, energy source, and capacity. Typical costs are $125 to $175 for combustion heaters of 10,000 BTU per hour capacity and $30 to $140 for a 1,320-watt (4,500 BTU per hour) electric heater.

Safety Requirements

The safe use of any heating unit should be of prime concern to consumers. Safety precautions for combustion-type heaters are determined by whether or not the products of combustion are released into the heated area. Unvented combustion heaters release the products of combustion into the heated area, which requires specific additional safety precautions.

Research at Yale University and Berkeley Laboratories has shown that the use of unvented combustion heaters in relatively tight rooms can increase the concentration of airborne pollutants to

levels that exceed recommended health guidelines.

Adequate ventilation, either through natural air exchange in some areas or by providing additional air exchange is absolutely necessary for the safe use of unvented combustion heaters. The potential problems created by unvented heaters have resulted in the production of newer models that provide for vented installations.

Vented combustion heaters usually are permanently installed and, with proper installation, do not circulate the products of combustion through the heated area. Electric heaters are available in either portable or permanently installed units. The installation and use of any heating device should conform to its manufacturer's recommendations and local building codes. Specific safety precautions are listed below:

Unvented Combustion Heaters

1. Check unit for UL listing label — this means the unit has passed the Underwriters Laboratories safety tests.
2. The Minnesota Building Code prohibits the use of almost all unvented heaters in bedrooms.
3. Always provide adequate ventilation since the by-products of combustion are released into the room. Follow the manufacturer's instructions on providing adequate ventilation. This normally requires opening a window at least ½ inch.
4. Use only the proper kerosene fuel — this is type 1-K water clear kerosene. Always keep type 1-K in a container marked "kerosene." Never store the fuel inside the house. Take heater outside for refilling and never fill a heater that is burning or still hot. Always keep the wick properly adjusted.
5. Be sure to follow manufacturer instructions for adjusting and changing wick.
6. Keep heaters away from combustible material — at least three feet is a good distance. Do not set heater directly on a carpeted floor.
7. Heaters become extremely hot when in operation — keep children and pets away from unit.

Electric Heaters

1. Check unit for UL listing label — this means the unit has passed Underwriters Laboratories safety tests.
2. Electrical wiring must be adequate for heater. A 15-amp circuit will handle a 1500-watt heater if no other appliance is on that circuit. Safety devices (fuse-circuit breaker) should not be altered. In no case should a larger type fuse be installed. If needed, use a different circuit or contact your power supplier. Make sure bathroom areas are equipped with Ground Fault Circuit Interrupters (GFI). If there are any questions on GFI's, consult an electrician.
3. Keep heater away from combustible materials.
4. Some heaters become extremely hot when in operation — keep children and pets away from these units.

Vented Combustion Heaters

1. Check for UL listing — if so labeled, unit has passed Underwriters Laboratories safety tests.
2. Venting avoids inside air pollutants associated with unvented heaters.
3. All other safety tips listed under unvented combustion heaters should be adhered to.

The author wishes to thank Roger A. Peterson, former residential energy specialist with the Minnesota Agricultural Extension Service; Charley Shaul, North Central Electrical League; Larry Esko, Minnesota Power; and Larry Lorensen, Offerman and Associates, for their consultation and review of the manuscript.

The information given in this publication is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Minnesota Agricultural Extension Service is implied.

Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Norman A. Brown, Director of Agricultural Extension Service, University of Minnesota, St. Paul, Minnesota 55108. The University of Minnesota, including the Agricultural Extension Service, is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, creed, color, sex, national origin, or handicap.